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CENTRAL INTELLIGENCE AGENCY

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WTBG Development of a Calorimeter

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1. The following are technical specifications for Project No. 54-17, which is to be carried out in 1954 by the Scientific-Technical Office for Device Construction(WTBG)(NTB-3) of SAG Kabel. The project concerns the development of a calorimetric installation for the measuring of heat effects in heated metals. The specifications [redacted] at "TSG" are signed by Chief Engineer Rudnev (fmu). They are described as a "short description of the circuit diagram of the calorimetric installation for measuring heat effects in heated metals". The following [redacted] specifications: 1/ 25X1

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1. The basis of the experiment is the generation of adiabatic conditions under which the body under investigation is to be heated by heat currents without loss of heat. Hereby, the time will be measured during which a certain temperature increase of the system takes place.

The wiring of the installation includes five circuits:

- 1) Heat circuit of the oven
- 2) Heat circuit of the calorimeter
- 3) Differential thermometer
- 4) Measurement of temperature and heating speed
- 5) Temperature regulation of the cold soldering place.

- 1) The heat circuit of the oven consists of two regulating rheostats, a heating resistance of chromium-nickel, a wattmeter, and a voltmeter. The wattmeter has a measurement range of zero to 1.5 amperes and a scale unit of 0.01 amperes. The voltmeter has a measurement range of zero to 4 volts and a scale unit 0.01 volt. The heating speed will be regulated manually with the aid of a rheostat and will be kept at one centigrade per minute throughout the experiment.

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- 2) The heat circuit of the calorimeter serves the purpose of measuring the current on the spiral of the heater. Measurement is performed according to the compensation method, with an accuracy up to the fourth decade. The circuit includes a Thomson's bridge from Hartmann und Braun, a rheostat, a wattmeter, a commutator, a battery of ten alkaline accumulators, a one-ohm resistance, a standard element, and a mirror galvanometer with ten power minus six voltage sensitivity.
- 3) The third circuit serves for the measurement of the temperature difference between the case (Huelle) and the calorimeter proper. It consists of a differential thermometer in whose circuit the sensitive Hartmann und Braun mirror galvanometer and an oil shunt are inserted.
- 4) The fourth circuit has the purpose of measuring the temperature of the calorimeter proper and of the speed of its heating according to the compensation method. The electromotive power of the thermoelement of the calorimeter will be measured with a five-stage compensator (Dieselhorst, Wolf firm, also an additional resistance and a double commutator) with small resistance, free of thermocurrent, and with a mirror galvanometer with 10 Ohm internal resistance and ten power minus twelve voltage sensitivity (type Zernicke, Kiep und Soehne). This circuit also includes a standard element and three resistance magazines.
- 5) The fifth circuit, the automatic thermometer-regulator, will keep constant the temperature of the cold soldering place. This will be performed by a thermometer-regulator with photo-relay. The temperature is to be kept constant at 25 plus minus 0.005 centigrade.
- II. The following list of needed devices and accessories has been established on the basis of the foregoing description of the circuit diagram of the installation:
- a. A mirror galvanometer of Zernicke type from Kiep und Soehne. Sensitivity: ten power minus twelve.
 - b. A mirror galvanometer of Siemens und Halske. Resistance 10 Ohm, additional resistance 100 Ohm, Sensitivity: ten power minus eight.
 - c. A mirror galvanometer from Hartmann und Braun. Type 150, 5 Ohm, coil 50 to 100.
 - d. Two mirror galvanometers. Sensitivity: ten power minus six.
 - e. A Dieselhorst compensator from the Wolf firm. Five decades; furthermore, additional resistance and double commutator.
 - f. A Thomson's bridge from Hartmann und Braun.
 - g. A resistance magazine from the Wolf firm, 0.1 to 10,000 Ohm with lever;
 - h. A resistance magazine from Siemens und Halske, 0.1 to 1,000 Ohm with lever;
 - i. A resistance magazine from Hartmann und Braun, 0.1 to 500 Ohm with plug.

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- h. A wattmeter with pointer, 1.5 Ampere, scale unit 0.01.
- i. A voltmeter with pointer, 4 volt, scale unit 0.01.
- j. A shunt connection according to Volemann, without galvanometer.
- k. Two standard elements.
- l. Three standard resistances of 1.5 and 10 Ohm.
- m. Three optical tubes with a focal length of 2 meter.
- n. Three mercury thermometers with a scale of 0.01 centigrade.
- o. 16 ceramic tubes (steel tube, silver case).
- p. 16 meter platinum and platinum rhodium thermo-elements.

1/ Comment. The specifications were originally drawn up in Russian and then translated into German. The German translation is quite poor and in places equivocal. The accuracy of the English translation, therefore, cannot be guaranteed.

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